National Institute of Environmental Health Sciences

An examination of climate change on extreme heat events and climate-mortality relationships in large US Cities

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Abstract:

This study examines the impact of a changing climate on heat-related mortality in 40 large cities in the United States. A synoptic climatological procedure, the spatial synoptic classification, is used to evaluate present climate-mortality relationships and project how potential climate changes might affect these values. Specifically, the synoptic classification is combined with downscaled future climate projections for the decadal periods of 2020-29, 2045-55, and 2090-99 from a coupled atmospheric-oceanic general circulation model. The results show an increase in excessive heat event (EHE) days and increased heat-attributable mortality across the study cities with the most pronounced increases projected to occur in the Southeast and Northeast. This increase becomes more dramatic toward the end of the twenty-first century as the anticipated impact of climate change intensifies. The health impact associated with different emissions scenarios is also examined. These results suggest that a "business as usual" approach to greenhouse gas emissions mitigation could result in twice as many heat-related deaths by the end of the century than a lower emissions scenario. Finally, a comparison of future estimates of heat-related mortality during EHEs is presented using algorithms developed during two different, although overlapping, time periods, one that includes some recent large-scale significant EHE intervention strategies (1975-2004), and one without (1975-95). The results suggest these public health responses can significantly decrease heat-related mortality.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES), Other Climate Scenario

Special Report on Emissions Scenarios (SRES) Scenario: SRES B1

Other Climate Scenario: SRES A1F1

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Temperature, Unspecified Exposure

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location:

resource focuses on specific location

United States

Health Impact:

specification of health effect or disease related to climate change exposure

Injury, Other Health Impact

Other Health Impact: heat related mortality

Intervention:

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

Model/Methodology:

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

Climate Change and Human Health Literature Portal

A focus of content